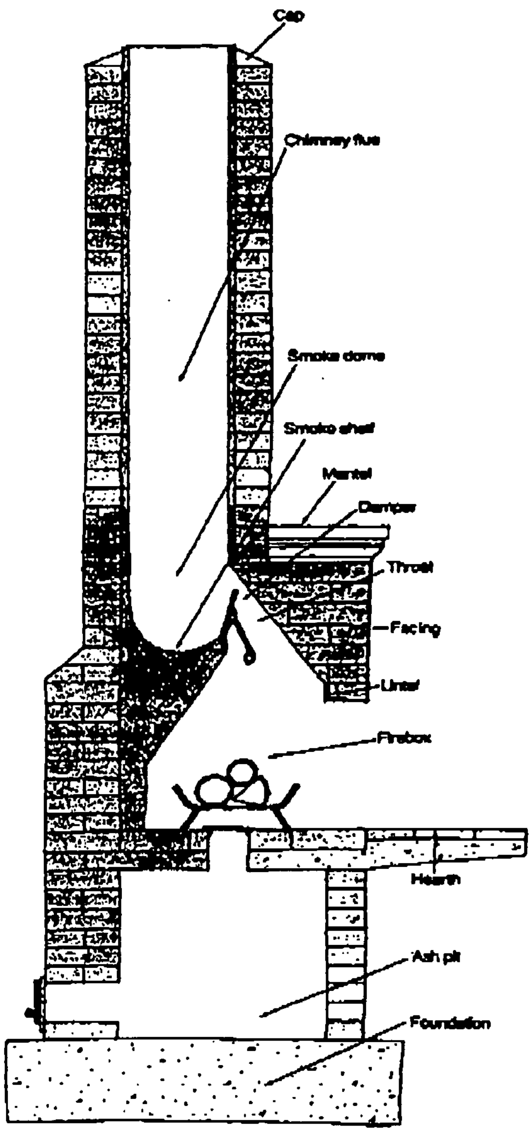
ENCLOSURE (B)

How to Plan and Build Fireplaces

By the Editors of Sunset Books and Sunset Magazine

Lane Publishing Co., Menlo Park, California

How a conventional fireplace works



Chimney flue

Smoke and combustion gases from the burning wood pass up the chimney inside a flue, usually made of large-diameter terra cotta pipe or insulated steel.

Smoke dome

Acts as a funnel to compress smoke and gases rising from the fire so they will squeeze into the chimney flue above.

Smoke shelf

Bounces stray downdrafts back up the chimney before they can neutralize the updraft and blow smoke into the room.

Throat

Slotlike opening above the firebox, where flame, smoke, and combustion gases pass into the smoke chamber.

Damper

A steel or cast iron door that opens or closes the throat opening. Used to check and regulate draft, it prevents loss of heat up the chimney.

Lintel

Heavy steel brace that supports the masonry above the fireplace opening. Sometimes incorporated in the damper assembly.

Facing

Vertical surface around fireplace opening. May be built of various materials: brick, stone, concrete, tile, wood, metal.

Firebox

Chamber where the fire is built; made of steel or firebrick. Walls and back are slanted slightly to radiate heat into the room.

Hearth

Inner hearth of firebrick or steel holds the burning fuel; outer hearth of noncombustible material protects the floor from heat and sparks.

Ash pit

Ashes are dumped through an opening in the hearth into the fireproof storage compartment below. Many fireplaces today omit the ash pit.

Foundation

Usually a reinforced concrete slab; holds concentrated weight of masonry fireplace and chimney structures.

masonry and prefabricated rather than by mode of heating.

The choice is not as absolute as it may sound. The wide range of styles available in each category allows you to have the appearance of one type and the performance of another.

Masonry fireplaces

Though masonry fireplaces are difficult and costly to build, they continue to be popular for several valid reasons. Not only are masonry fireplaces strong and durable, they lend an air of structural solidity to the house they serve. Brick or stone adds a quiet beauty both inside and out. Perhaps most important, these materials impart feelings of permanence and stability because of the long traditions behind them. (Many people find it impossible to imagine keeping the home fires burning in a free-form, freestanding metal fireplace.)

For those who wish the durability and strength but not the nostalgia, masonry fireplaces can be fitted to modern decor by a facing of tile, decorative concrete, mirrored glass, or polished metal. Though the long wall is the traditional location for a living room fireplace, you're likely to find a modern design tucked away in a corner, acting as a room divider, or freestanding.

Because of their great weight—most are about 5,000 pounds—masonry fireplaces usually are found on the ground floor, though they can be stacked one above the other in two-story buildings. Because of their considerable bulk, most are built on outside walls if they come as an addition to an existing building. In new construction they may be located on inside or outside walls with equal ease, assuming there is no difference in grade levels.

Satisfactory fires depend upon some close relationships: firebox opening to firebox volume to damper size to chimney size and height. The basic arithmetic is fairly well worked out, but other fine shadings of shape and proportion require a skilled designer and careful masonry work. These design details can be circumvented by use of a prefabricated metal insert that includes a firebox, damper, and smoke dome. Such metal inserts come in both conventional and heat-circulating types, but still the masonry work demands professional skills. (Heat-circulating types may be made especially complex by their ductwork if this extends as flexible tubing rather than being incorporated into the shell of the fireplace.)

There is a less critical form of masonry that can be executed by homeowners. Concrete blocks can be stacked and reinforced properly by a moderately skilled amateur builder. (The design factors remain critical—and can be harder to control because of the large size of concrete blocks.) Concrete blocks also are less expensive than brick.

Prefabricated metal fireplaces

These fireplaces come in each of the major types—conventional, heat-circulating, and freestanding. (The first two are called "built-ins.") They all share the same basic advantages: relatively low cost, ease of installation, and freedom of location, thanks to their light weight (600 to 800 pounds with facing).

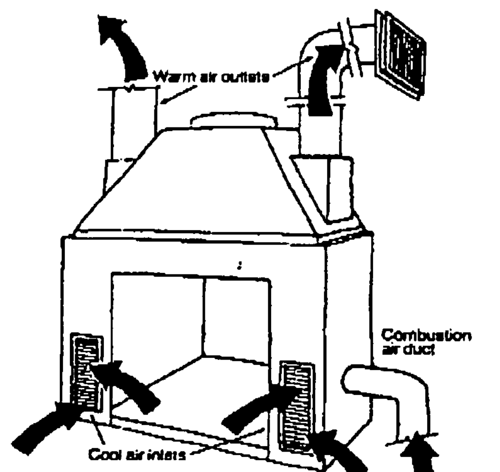
A prefabricated built-in unit automatically takes care of the critical relationships of fireplace opening size to volume of firebox to damper size, that must be resolved in designing a masonry fireplace.

Most prefabricated units of all types have zero clearance ratings—they can be placed directly against combustible walls and floors, which can mean an appreciable saving in space.

Almost all of these units also carry approval tags of one or more of the nationally recognized inspection agencies. These agencies include the International Conference of Building Officials (ICBO), Building Officials Code Administration (BOCA), and Southern Building Code Congress (SBCC). In addition, most of these fireplaces are listed as safe appliances by Underwriters Laboratories (UL). They have acquired general acceptance in local building codes.

The metal boxes may not last as long as a masonry fireplace lined with firebrick, but their record of durability is good.

The heat-circulating fireplace



Efficient, versatile. *Air warmed by a heat-circulating fireplace is returned to the same room by most units, but some —like the one shown here—can duct warmth into another room.*

Both masonry and prefabricated metal fireplaces are described more completely in the chapters beginning on page 64. See especially pages 64–73 for masonry and 74–87 for prefabricated metal.

Planning fireplace location

When fireplaces were the sole source of heat for both comfort and cooking, they were found in almost every room in a substantial house. Wherever they've been relegated to a role of supplemental heat source, it is rare to find more than one or two in a home.

The single fireplace usually is located where household members congregate to relax, converse, pursue leisure activities, and entertain guests—in the main living room or the family room.

But the fireplace's historical roles still point to useful ideas for other locations. Kitchen fireplaces offer a cook such fine possibilities as Dutch ovens, barbecue grills, even hooks from which to hang simmering pots. For an intimate fireside, the suitable rooms include dens, studies, bedrooms, or even that ultimate refuge, the bathroom.

If you've been thinking about a fireplace for some time, chances are you know in some detail where you want it and how you want it to look. Even so, asking yourself a few questions about your reasons for wanting a fireplace will help pinpoint some decisions. How often will you have fires? With whom will you share them? Are they mainly romantic additions to an atmosphere, or will they be necessary sources of heat? The next section can help you both ask and answer these kinds of questions.

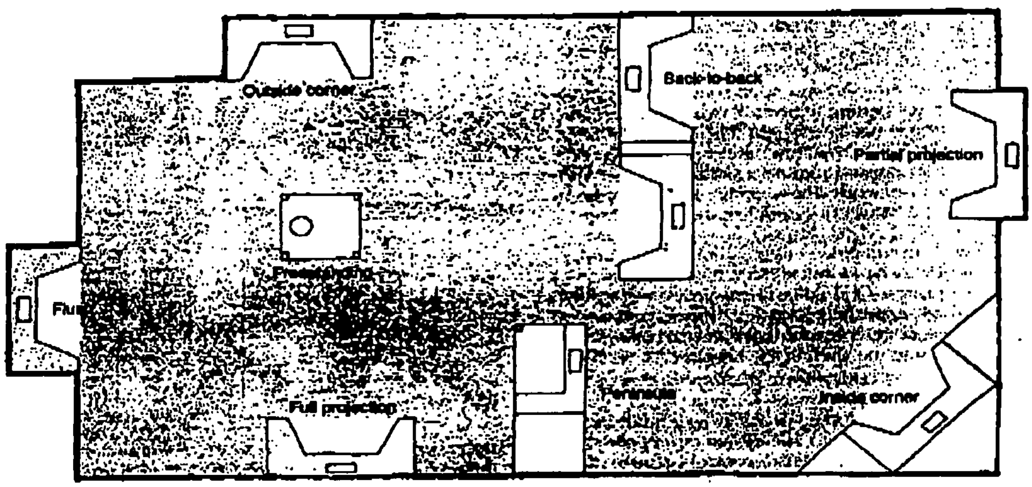
Fitting the fireplace to the room

At a holiday party, a generous fireplace attracts a dozen souls and more with its spreading warmth. On any wintry night, a cozy little fireside invites two, but no more, to pull their chairs up close for the peace and quiet.

Fitting a fireplace into a household means fitting it to both people and space. If the fire is to warm guests almost as often as it does the family, the hearth will need to be big enough to warm a throng, and the room big enough to hold one. At the other extreme, a hideaway fireplace will serve best if the scale is as intimate as the place.

This much is easy. But effective and functional placement calls for more than correct size and general location. For example, putting the fireplace opening too close to a door can produce drafts that billow smoke into the room, or cause unwanted traffic between the fire and those it warms. In short, you

Possible fireplace locations



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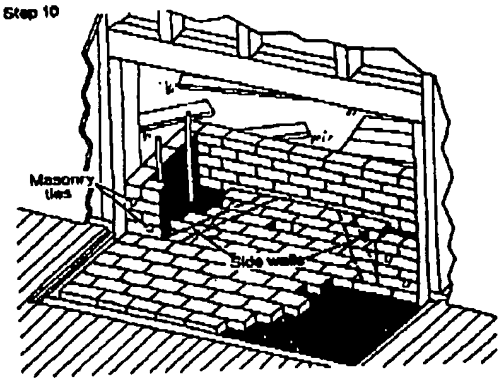

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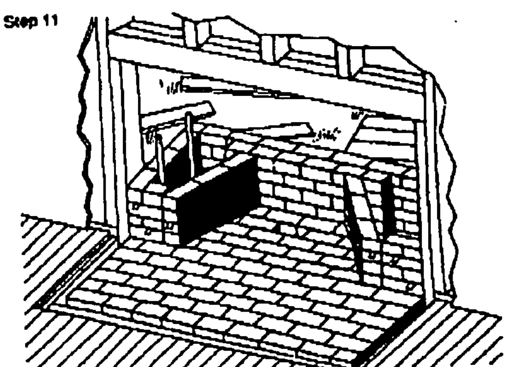

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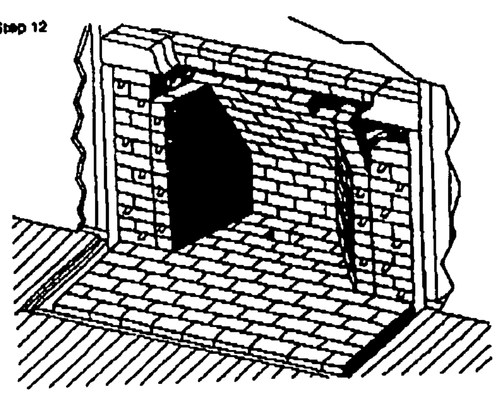


10) Finishing the hearth. Lay the inner hearth as soon as the subhearth has had about 12 hours to set and the outer brickwork has been brought up enough courses to reach slightly above finished hearth level. The inner hearth is laid with firebrick, bonded to the subhearth with a 1/2-inch-thick bed of fireclay mortar.

Note that the firebrick floor covers only the area needed for the firebox. When these bricks have been laid, they are usually covered with a layer of sand to protect them from mortar drops as the masonry is built up. The front hearth—usually laid with tile or common brick—can be set at this time or postponed until the facing is laid in place. Note the masonry ties, inserted in the mortar joints, for anchoring the facing when it is attached later. The dotted lines indicate the location of firebox side walls, which always angle inward to improve heat radiation.

11) Laying the firebox. The firebrick walls of the firebox may be laid at the same time as the outer brickwork, or they may be held off until the outer work reaches damper height. Firebricks are laid in a fireclay mortar that has been mixed to consistency of soft butter and applied in a layer 1/8 to 1/4 inch thick. Bricks are laid flat to give greater strength to the wall.

Back and side walls are laid simultaneously, one course at a time. (This must be done because the joints are a complicated set of angles; see step 12.) The space between the angled side walls and the outer brickwork should be filled with broken bricks or other bits and pieces of masonry dropped in loosely to allow for firewall expansion.

12) Setting in the back wall. Lay the back wall plumb for about 12 inches, then slope it forward to reflect heat outward and to provide for a smoke shelf. The angle of slope of this rear wall will be established by the size and height of the fireplace. The slope should form a plane, not a curve. (If the wall is curved, rising currents of warm air will not only flow into the room, they will bring smoke with them.) The rear wall should reach above the level of the lintel, to serve as the back edge of the throat and also as the back bearing surface for the damper.

Since side walls are usually laid to butt against the sloping wall, they have to be beveled at the back end to meet the angle of the wall. One way to cut side walls is to put each course of brick in place dry, hold a straight board (slanted at the proper angle) against the rear edge of the wall, and draw a line along the edge. Disassemble the upper course, cut the rear bricks on the line, and mortar the course into place. After both side walls are laid, the sloping back wall may be mortared in. Tip the first course above the straight wall by making a wedge-shaped joint higher in back than in front.

13) Providing a damper and smoke shelf. Except for smoke domes that both eliminate part of the masonry and have an incorporated damper, dampers fall into two main categories: blade and dome dampers. In the blade type, the damper door is hinged or swiveled in a flat frame. In the dome type (see drawing), the door is fitted into a metal housing shaped into a throat. Some dome dampers, such as the one shown here, are designed with a front edge that serves as lintel for fireplace facing, but most of them simply support the masonry of the inner brickwork. In the latter case, a lintel is installed (to support the facing) after the damper is in position.

Both damper and lintel should have their bearing surfaces at each end wrapped in fiberglass wool to allow for heat expansion.

Dampers come with a choice of controls for opening and closing. Some controls extend through the facing, some work by chain, some have levers operated by a poker.

14) Finishing the facing. With the firebox complete and the damper in place, it is time to build the facing. Don't forget to leave 2 inches of air space between both firebox and facing masonry and the header at the top of the opening. (The building code requires at least 2 inches of clearance between masonry and any combustible material adjacent to the firebox or flue.)

There are several patterns for finishing mortar joints in facings; consult a book on masonry for examples. To obtain smooth mortar joints, use a mason's pointing trowel. It is helpful to practice with it on some rough brickwork first.

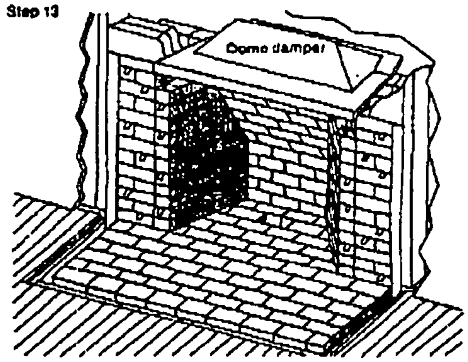
Restore the inner wall surface with patching plaster, strips of gypsum board, or whatever material matches the existing surface.

Lay the front hearth to the edges of the subhearth. Fill any gaps with strips of subflooring, then strips of finish flooring salvaged from that removed when you made the floor opening.

15) Sealing around the opening. To make certain that water will not seep into the house around the edges of the fireplace opening, seal all points where masonry passes through the woodwork. Where bricks meet wood framing, they should be laid against felt paper. Around the sides, where masonry meets exterior siding, the joint is flashed or caulked, depending on the type of siding. For stucco walls, use a stucco patch, available at home improvement centers.

Across the top of the firebox, metal flashing is needed to divert water away from the opening. Slip one angle of the flashing under the outer wall covering, cover with weatherproof paper, and then nail on the finished covering. The angle of the flashing that fits into the brickwork should be mortared into a running joint and sealed with mastic. Top flashing is shaped to overlap sides.

Step 13



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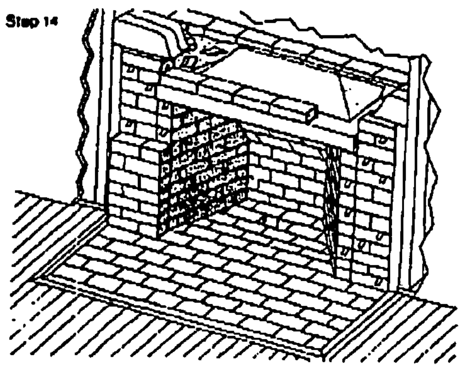

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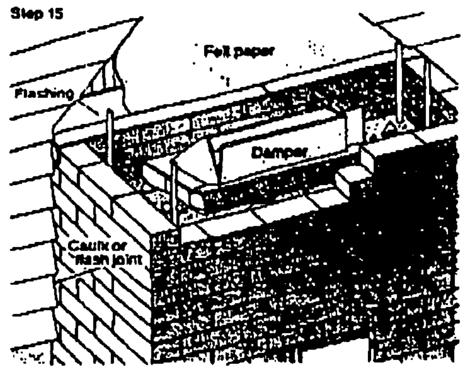

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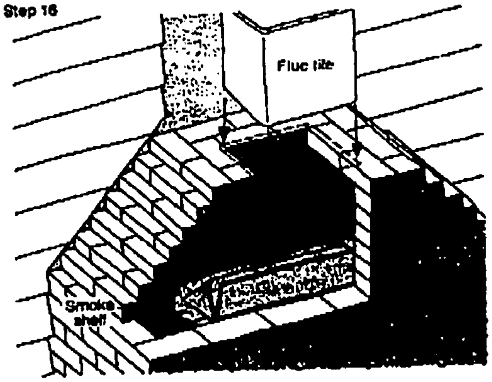

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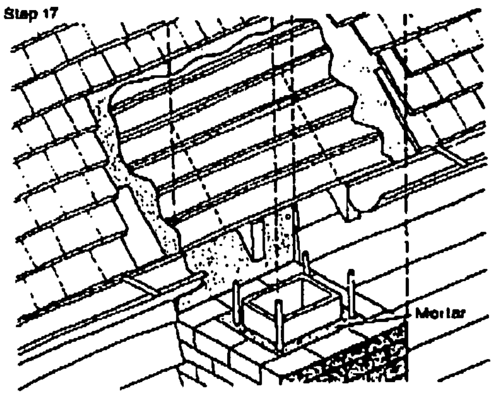

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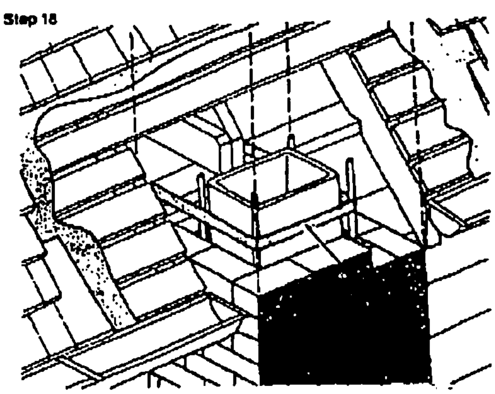


16) Building the throat and chimney. Brickwork on both sides of the firebox should be stepped in for six or seven courses until the throat narrows down to flue size. The last course should be laid to provide a ledge just wide enough for the flue tile to rest upon.

The sloped inner surface—which forms the smoke dome—should be smoothed with mortar to ease the passage of the flue gases and to prevent soot buildup. Mortar used for this job should be slightly richer (more cement, less sand) and drier (less water) than that used for laying brick. Mortar is applied with a square-edged plasterer's trowel. Brick used for the inner surface of the smoke dome should have a textured surface so the mortar will key into it.

Before setting the chimney, fasten weatherproof paper on the house wall where bricks will rest against it. When setting flue tiles, it is more practical to set and cement them in place, then lay the outside bricks around them. (If bricks are laid first, the new masonry is likely to be damaged when the heavy tiles are positioned.) To cut a tile to length, place a cement sack inside, fill tightly with sand, then sever with a series of chisel cuts.

17) Penetrating the roof. At the point where the chimney passes the roof line, it is necessary to cut into the eave in order for the chimney to pass and to install an anchoring device to brace the chimney.

Clear away the shingle or composition roof surfacing for an area a foot larger all around than the opening needed for the chimney.

Mark cutting lines on the roof sheathing 2 inches wider than each side of the masonry and saw out the pieces. Remove enough of the sheathing so you can freely reach the plate. If the tips of the rafters extend beyond the roof line, cut them off flush with the outside wall. If your house is equipped with gutters, cut them with a hacksaw. Note the reinforcing steel in each corner of the chimney masonry, sealed in with mortar. To repeat, this is required only in earthquake country; some local codes ignore it.

18) Tying-in the chimney. The chimney must be anchored to the framing of the house by some means at the point it passes the roof line. There are several ways to do this. The drawing shows one of the most common. A 1-inch iron strap is bent around a tile (and the reinforcing steel, if any), twisted to pass flat through a mortar joint, and nailed to the top plate or to a rafter. If you must fasten to a ceiling joist, nail cross supports across several joists to help distribute the load.

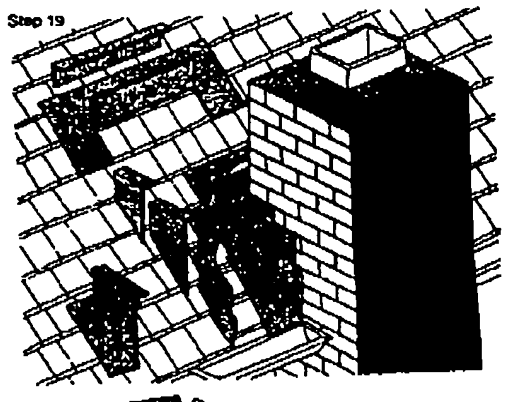
Repair cut gutters by filing off rough edges and soldering caps on each of the cut ends. Be sure to buy caps of the same metal as the gutters; otherwise electrolytic reaction between the different metals will corrode the edges and destroy the seal. (Be sure, too, that there is a downspout to drain each of the severed gutters.)

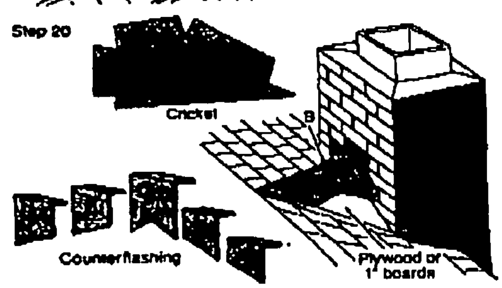
19) Fitting the flashing. Install metal (copper, lead, galvanized iron, aluminum) flashing around the chimney to seal the opening against water leakage. Flashing is applied in two layers. The bottom layer (B and E in the drawing) is fitted under the roof covering and bent to lie flat against the brickwork. The second layer (A, C, D in the drawing) is cemented and caulked into the masonry and fitted so it overlaps the first layer. This is known as counter flashing.

Except where they overlap, flashing joints should all be soldered. Allow some leeway between cap and base flashing to permit the chimney to settle or move slightly without rupturing the seal. In very cold climates, a cricket (next step) is substituted for flashing on the upside of the chimney.

20) Installing a cricket. In severe winter regions, a cricket or saddle is constructed on the upside of the chimney to divert water and snow away from the top side. Snow and ice collecting against a chimney can seriously damage flashing, resulting in a leaky roof. Heavy snow loads may even do structural damage to the masonry itself.

A sizable cricket consists of a ridgeboard and post, sheathed with plywood or 1-inch boards and covered with sheet metal. Crickets for smaller chimneys may be all sheet metal. Metal flanges extend several inches under shingles and up the chimney. Counter flashing covers the joint where the cricket meets the chimney. You can have the cricket made at a sheet metal shop at the time you order flashing. Install the cricket and counter flashing in the alphabetical sequence shown.





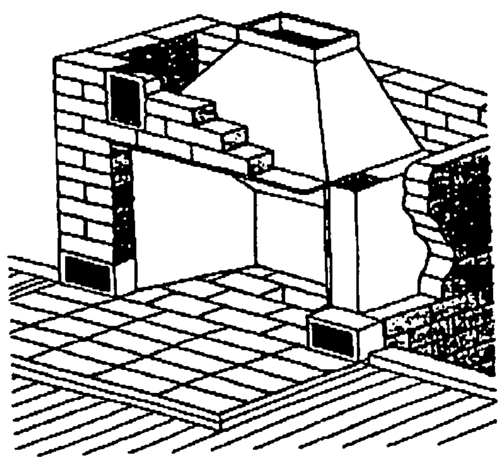
Using a metal insert

Several manufacturers offer metal inserts for masonry fireplaces. These replace the firebox, smoke dome, and damper—saving the complicated work of building the first two and seating the third of these. They also assure correct firebox dimensions and shape for efficient draw in the chimney.

As comparison, using a prefabricated metal insert replaces steps 10 through 13 of our typical installation, as well as the corresponding design work.

Some units are conventional, but a majority are designed to make the fireplace a heat-circulating one. The heat-circulating design shown at right is a composite of several manufacturers' units. As indicated, most inserts incorporate the ducts into the basic shell. (A number of prefabricated built-in fireplaces are designed with flexible ducting; see the drawings on page 75 for comparisons.)

Inserts are available in a range of sizes in both conventional and heat-circulating models. When installed, these units require at least 1 inch clearance between their outer shells and surrounding masonry to allow for heat expansion of the metal firebox.



PREFAB INSTALLATION

A typical prefabricated fireplace installation requires neither the credentials of an architect nor the experience of a veteran contractor. Most freestanding fireplace installations are very simple indeed, needing only small openings in wall or ceiling and roof to permit passage of the chimney. Even built-in units may call for no more than modest framing skills. But this is not to say there are no problems at all. Fireplaces built outside a wall and enclosed in a chase may well be beyond average amateur skills.

For the most part, this chapter is meant to serve as a guide to help you plan your specific installation. The emphasis is on how to shop for a fireplace that will meet your needs and how to work out the detailed design you will need to get a building permit.

If you do elect to install your own fireplace, the key as always is planning and more planning. Whether you opt for a freestanding fireplace or a built-in, a successful job depends on knowing where the fireplace will sit, down to the sixteenth of an inch, and what will happen inside the wall or above the ceiling as a result of the placement. Success also depends on knowing how much of what kinds of material you will need to support the fireplace, and how to organize the project from first measurement to last tap of the hammer...or stroke of the trowel.

To simplify explanations, we have divided this chapter into subsections by type of installation. After some initial general advice, there are separate discussions of built-in and freestanding installations. In addition, we have separated the descriptions of built-in installations into inside-the-wall and outside-the-wall sequences, since the requirements in these two cases are not at all the same. If you still are in the planning stage, look through these sequences to get concrete ideas of the options available to you.

Built-in fireplaces

Almost certainly you will have chosen between a heat-circulating and a conventional built-in fireplace early in the planning stages. But this is only the first question. Dozens of models offer hundreds of options, some of them important to heating efficiency, some of them crucial to a fireplace's capacity to fit into your planned installation, some of them important only as esthetic choices.

Unhappily, planning cannot be as untroubled as we all wish when it centers on an object that is prefabricated—which is to say not adaptable to every whim. There must be a certain amount of taking one step forward and two back, especially if the fireplace is being added to an existing structure. Questions fall both upon the fireplace and upon the structure into which it must fit, and all must be answered before you can buy a built-in without fear of finding out too late that something will not fit your situation.

What's available in fireplaces?

To get the fireplace best suited to your needs, shop as widely as you can. Looking first-hand at what is available is the best teacher, and talking with dealers will raise new questions at every turn. This section asks some of the commoner questions and answers some of them.

Dimensions. Typical built-in fireplaces have firebox openings in the range of 28 to 42 inches wide and 16 to 24 inches high. As noted in the chart on page 11, the size of your room will govern to a considerable degree the size of this opening.

Just as important are the overall dimensions of the fireplace. These will determine—at least in part—whether the fireplace projects fully into the room, is placed entirely outside the wall, or falls somewhere between. Typical outside dimensions for built-in fireplaces range from 38 to 52 inches wide, 23 to 26 inches front to back, and 40 to 58 inches from bottom of firebox to top of smoke dome. In short, there is far more variation in overall size than in firebox opening.

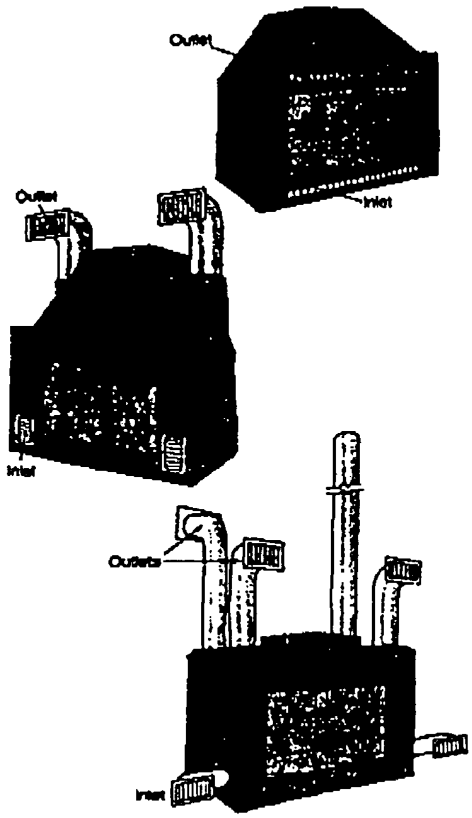
Detailed dimensions may matter even more than overall dimensions if you somehow must work with tight space. For one example, the chimney collar may fall at the center of the front-to-back axis, or it may fall on one side or the other of center. Since chimneys must be at least 2 inches away from combustible materials, the exact location of the chimney collar might allow you to run your chimney as planned in a partially projecting fireplace, or might prohibit you from putting it where you expected.

Similar questions can be raised about duct openings in heat-circulating models, as their placement varies even more widely than that of chimney collars.

Duct placement in heat-circulating fireplaces. Warm air rises, cold air sinks, so the first rule of duct placement is simple enough: cold air intakes are at or near the bottom of the fireplace, and warm air outlets are at or near the top. Still, manufacturers offer a great variety of placements of both intakes and outlets, and for good reasons.

To decide which placements will work best for you requires a thoughtful appraisal of where you wish the warmed air to go, and a careful look at how the face of the fireplace will relate to duct openings. This is of prime importance if you are looking at models with fixed inlets and outlets, but even models with adjustable ducting have some limitations that may make one unit preferable to others.

For one example, it is difficult or impossible to place an outlet vent lower than the point at which the adjustable portion of the ducting leaves the fireplace shell. In a situation where you wish to get warmed air into the room at the lowest possible elevation in order to get maximum warmth near the fireplace, it will pay to look for models with relatively low outlets.



***Variations on the theme** of heat circulation are several. Units that expel warmed air at the top of the fireplace opening serve best if heat is meant to be kept close to the fireplace; higher outlets send air farther away.*

On the other hand, if you want some of the warmed air to rise into a stairwell, or even to be ducted into an upstairs room, you might prefer to look for a unit with ducts placed higher off the floor.

Another point on placement: some models are designed to take air in from the front and expel it from the sides, or vice versa. In others, all vents are in the front. This may be a factor in how you can design your fireplace facing. Corner fireplaces, for example, are easier to frame if all vents are at the front. So are fireplaces set outside a wall.

If you're fighting for space, you may need a fireplace with ducting and vents incorporated into the shell rather than extending out to each side.

Forced air circulation. If a heat-circulating fireplace is to be located in a room of large volume, you may wish to look into low-velocity fans for the ducting. These are built into some luxury models or may be added as options in others. The idea is the same as in a forced air furnace: to mix air evenly rather than let it drift into warmer and cooler layers. Fans may be most valuable in rooms with high ceilings, where warm air tends to rise above head height if it is not kept moving.

Outside air duct for combustion. The heat efficiency of any fireplace is improved by ducting combustion air from outside. As noted in the opening chapter, weathertight houses can inhibit draft too much for a fire to burn well, and draft-ridden houses can even experience a net heat loss as the fire sucks outside air through cracks around doors and windows to feed combustion. The placement of an inlet in a built-in fireplace can be crucial. In some models, the duct is in the firebox floor, so it must reach down into a crawl space or basement. In others, paired ducts at the sides are flexible, so they can reach down through the floor or out through a wall; these add several inches to the width of framing.

Fireclay lining in firebox. All firebox floors are lined with fireclay. In some units, all firebox surfaces are lined. In others, only the back wall may be. In still others, you can buy clip-in side walls to complete the lining. (There is an esthetic choice, too. Some linings are patterned to look like brick; others are smooth surfaced.)

The functional difference is *when* you get warmed, not how much. The fireclay slows the convection process at first, but once heated, it keeps warming air even after the fire dwindles.

Knockout for gas jets. If you plan to have a gas log lighter, placement of the knockouts can be a factor, especially if you will have to work in cramped space or if you plan a partial projection of the fireplace. Most units have knockouts on both side walls.

Weight. Fireplace units alone weigh in the range of 150 to 400 pounds. Class A chimneys 15 inches in diameter weigh about 8 pounds per lineal foot. Since floors are designed to carry dead weight loads of 40 pounds per square foot, these weights are not critical in themselves. However, if you plan to use one of the heavier facings around your fireplace, total weight may require extra under-floor support. You will want to keep accurate measure, especially if the installation is away from a bearing wall.

What's available in chimneys

Built-in fireplaces must be connected to Class A (all fuel) chimneys. To meet codes, these chimneys must be installed with approved supports and other related devices. Use only pipe and components provided or specified by the fireplace manufacturer.

Class A chimneys come in varied lengths (usually 12, 18, 24, 36, and 48 inches) and outside diameters (8, 10, 12, and 15 inches). Which diameter you use will be governed by the collar on top of your fireplace. Lengths usually are mixed in any one installation in order to keep joints away from combustible materials and to allow maximum support. Some dealers offer formulas for mixing lengths.

Most Class A chimneys are designed to allow weather exposure, but some are meant only for use in protected conditions.

Unlike fireplaces, they do not allow zero clearance. In most cases, the walls are 2 inches thick and must have 2-inch clearance from combustible materials all around.

To maintain required clearances in inside installations, manufacturers offer firestop spacers for use when the chimney passes through a ceiling or floor, and flashing for use at the roof. For exterior installations, wall bands serve the same purpose.

Most codes also require that these chimneys be capped as weather protection. A majority of caps double as spark arresters.

Elbows—usually available in 15° and 30° bends—allow offsets in chimneys. For a minor shift, two can be fitted directly together. To accomplish a larger offset, a length of pipe can be sandwiched between a pair.

For situations where a chimney passes through a wall, you will need a thimble—a special type of firestop spacer. There are designs for both horizontal and angled chimneys.

Above the roof, you will need flashing, a storm collar, and a chimney cap for weather protection. Most caps double as spark arresters. In some cases, you may also need bracing.

Measuring for a chimney. To estimate your needs, first make an elevation sketch of your house similar to the one at right. As shown, measure the height of the fireplace room (A), the room above, if any (B), and the attic from the proposed ceiling opening to the high side of the roof opening (C).

Next, figure the chimney height above the roof. The chimney must extend at least 3 feet above the high side of the roof opening, and must also be 2 feet taller than the highest point on the roof within 10 feet of the opening (measured horizontally, as shown). The highest point may be a ridge, dormer, or cupola; on steep-pitched roofs, the point may fall on the roof plane itself. To get the total height, add the above-roof height to measurements A, B, and C, plus the thicknesses of ceilings and roof.

To determine the amount of chimney pipe needed, subtract from your original total the height of the fireplace, and that of a raised hearth if you're using one. Note any offsets.

This information will allow your fireplace dealer

ENCLOSURE (C)

BOOK OF SUCCESSFUL FIREPLACES

How to Build, Decorate and Use Them

20th edition

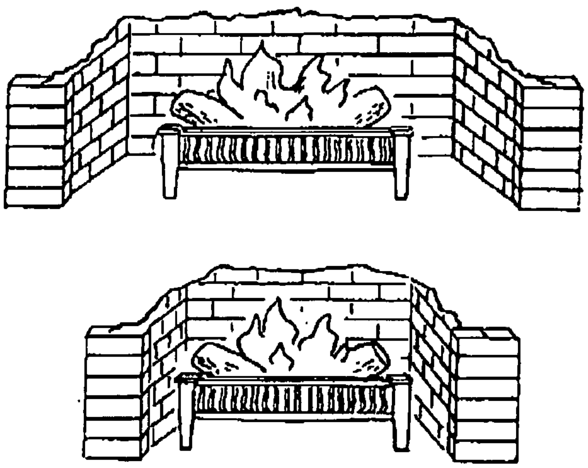
by R. J. Lytle and
Marie-Jeanne Lytle

Structures Publishing Company
Farmington, Michigan 1977

5. Conventional Fireplaces

The conventional masonry fireplace has become the standard in America—by being suitable to our needs; adaptable to our fuels of wood or coal; moderate in cost, or elaborately expensive to suit the variable needs or desires; enjoyable in home, cottage, camp, club, office or mansion; as a main source of heat and comfort or, in buildings with central heat, as a supplemental or emergency heat source, and, in all cases providing the nostalgic, heart-warming pleasures of a blazing log fire.

Planning the location, size, and general character of your fireplace is a subject worthy of careful study by architects, builders, homeowners, and masons. Factors of location, interior planning and design are covered in Chapter 2.



Handicap of Too Large a Fireplace. Top—fireplace too large for fire. Radiates less heat than where flame fits the fireplace smoothly—as bottom.

The Question of Size

Home planners often need to be warned against the sentimental desire for "a great big fireplace." They forget that a great big fire would probably drive them out of the room. They need to be told that a small fire in a big fireplace is not efficient heating.

As mentioned earlier, a fireplace thirty inches wide, well filled with flame, will provide more heat than the same fire built in a larger fireplace.

Heat radiated from a fireplace comes, to a large extent, from the heated brickwork that surrounds the flame. The closer the brickwork to the flame, the more it is heated. In the case of the thirty-inch fireplace in the diagram above, the back and sides are both heated. In the forty-eight-inch fireplace, only a portion of the back masonry is heated. More heat undoubtedly goes up the chimney.

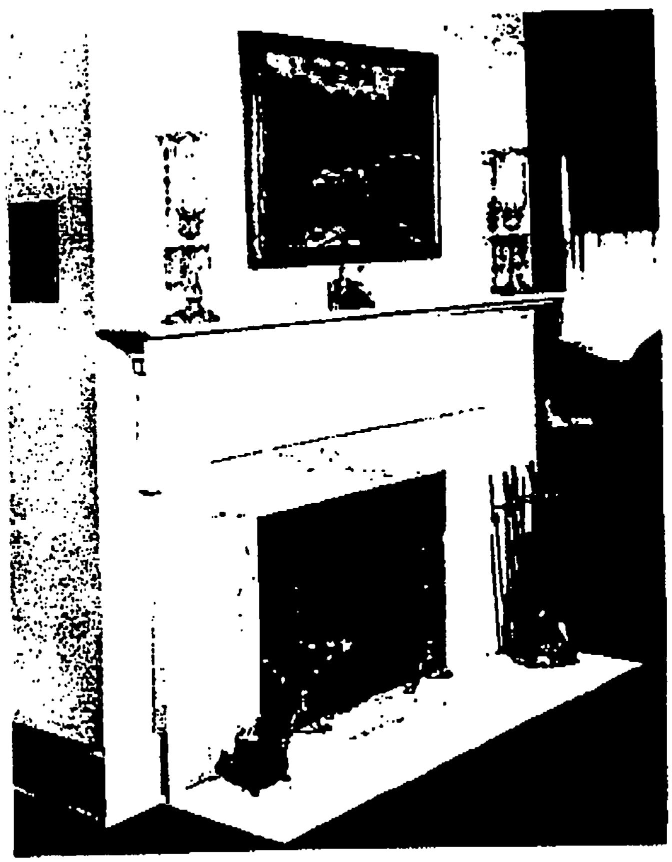
The larger fireplace requires a larger flue. In case of the forty-eight-inch opening, the flue lining would have to be the sixteen-inch-by-sixteen-inch size, while the smaller, thirty-inch fireplace would be adequately served by a twelve-inch-by-twelve-inch flue. To maintain a steady draft, the larger flue would need 50 per cent more air from some source. With a moderate-size fire, it probably would not get such a volume of air. The up-draft would tend to be sluggish and, if ventilation were restricted, there would be a tendency to downdraft. And, presuming that a good draft were established in the larger flue, there would plainly be more cold air to heat.

So, plan no larger fire than your room requires, and plan the fireplace to fit the fire snugly if you want maximum warmth.

Plans

If carefully tested plans such as those shown in this book are used, or the fireplace is built in accord with the tables and technical standards provided, the operation should be completely satisfactory. Where trouble is encountered it will be found to be caused by some environmental condition or the violation of the basic rules found herein.

6. Heat Circulating Fireplaces



The all-metal heat-circulating fireplace serves an efficient fireplace with any desired exterior trim treatment. Air inlets or outlets that provide heat circulation (shown on the side) can be extended to other rooms, as well as artistically treated in the finished trim. (Majestic)

More than three hundred years of experiment have been devoted to the problem of going beyond the masonry fireplace and conserving heat ordinarily wasted up the chimney. The first step in this direction came about forty years ago with the introduction of the circulator fireplace.

Your masonry fireplace gives you only the radiated heat from the fire. A circulator fireplace gives you the radiated heat from the fire, plus the other kind—the circulated, convection heated air—greatly increasing the value received from the fuel you have paid for.

For the summer cottage, for the hunting cabin, or a between-season home heating system, or simply for use on those days when quick warmth will feel good but the use of the furnace is not quite justified, the circulator will pay for itself. In colder climates, the circulating fireplace will pay its small additional cost in reduction of fuel used by the main heating system. An additional advantage of this form of fireplace is its pre-built nature permitting ease of installation by the do-it-yourselfer or unskilled workman. This approach eliminates much of the measuring, checking, and guesswork involved in the construction of a conventional masonry fireplace. At the same time, the circulator retains the conventional appearance and charm.

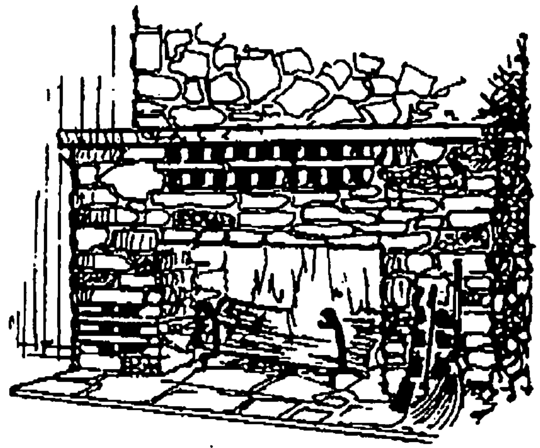
How They Work

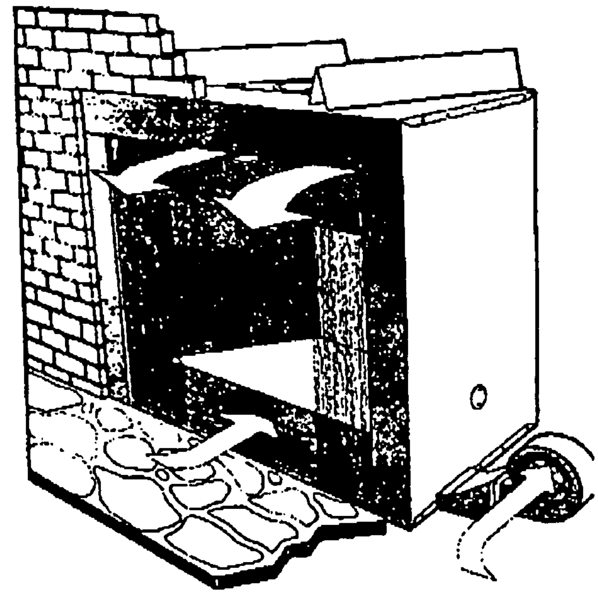
Like a warm-air furnace, circulators have double-wall construction. The inner steel wall surrounds the fire chamber as does the firebrick in a masonry fireplace.

Between the inner and outer walls is an air chamber. Air comes into this chamber through grilles at floor level, is heated by contact with the walls of the fireplace, and discharged through registers to the interior of the home. Additional heating efficiency can be obtained by adding fans to the warm air ducts which also permits the heating of a greater area.

An example of the greater heat extraction from a circulator follows. A typical thirty-six-inch width of fireplace front opening has approximately one thousand square inches of area through which the heat radiates. A modern circulator of similar size will have nearly three

CONVECTION FIREPLACES





thousand additional square inches of steel surface exposed either to the fire or the hot products of combustion. These steel surfaces heat the air passed over them by convection and pass it on to the room—or even adjacent rooms—through a system of strategically located intake and outlet ducts and grilles.

A new concept in heat circulating fireplaces. Some are now completely pre-built, like this Western Fireplaces model. Air comes in at the bottom, circulates around refractory line, and then out the top. No masonry required except for hearth and decorative surround. (A. R. Wood)

Architectural Planning

Circulating fireplaces can be located in any location that a conventional masonry fireplace may occupy. Their location on an interior wall may be dictated by the desire to heat two or more rooms from the several ducts available.

Circulators are available from some manufacturers as corner models, right and left hand and as through wall units opening on two rooms. In conventional fireplaces of this type, an extremely high percentage of the heat is lost up the chimney. With a circulator a good deal of this can be captured, and at the same time the unique charm of this type of fireplace is retained. Manufacturer's instructions about draft, flue size, chimney cap, etc., should be closely followed.

The placement of grilles often affects the appearance of circulators. In many cases, outlet grilles are located in the upper masonry of the fireplace front. Should some other location be preferred architecturally, projection of the fireplace from the plane of the wall leaves an inconspicuous side position available for them. Shelving may further disguise their presence.